Homework 3

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The following table gives the elongation e in inches (in./in.) for a given stress S on a steel wire measured in pounds per square inch (lb/in.^{2}). Test the models $e = c_1 S$ by plotting the data. Estimate c_1 graphically.

Table 1:

$S(x10^{-3})$	5	10	20	30	40	50	60	70	80	90	100
$e(x10^5)$	0	19	57	94	134	173	216	256	297	343	390

2 Problem : Page 121: 2.a

For each of the following data sets, formulate the mathematical model that minimizes the largest deviation between the data and the line y= ax+b. If a computer is available solve for the estimates of a and b.

Table 2:

x	1	2.3	3.7	4.2	6.1	7.0
y	3.6	3.0	3.2	5.1	5.3	6.8

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Data For planets

Body	Period (sec)	Distance from sun (m)
Mercury	7.60 x 10^6	5.79 x 10^10
Venus	1.94 x 10^7	1.08 x 10^11
Earth	3.16 x 10^7	1.5 x 10^11
Mars	5.94 x 10^7	2.28 x 10^11
Jupiter	3.74 x 10^8	7.79 x 10^11
Saturn	9.35 x 10^8	1.43 x 10^12
Uranus	2.64 x 10^9	2.87 x 10^12
Neptune	5.22 x 10^9	4.5 x 10^12

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a. In the following data, W represents the weight of a fish (bass) and l represents its length. Fit the model $W = kl^3$ to the data using the least-squares criterion.

Table 3:

Length, l (in.)	14.5	2.3	3.7	4.2	6.1	7.0
Weight, W (oz)	3.6	3.0	3.2	5.1	5.3	6.8

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